

Remarks

Allowance of all claims is respectfully requested. Claims 1, 4-9, 11-13, 16-20, 22-24 & 27-29 remain pending.

Initially, Applicants gratefully acknowledge the indication of allowability of claims 11-12 & 22-23 if rewritten into independent form including all the limitations of the base claim and any intervening claims. Responsive to this indication, claims 11 & 22 are rewritten herein into independent form. Thus, claims 11-12 & 22-23 are in condition for allowance.

By this paper, independent claims 1, 13 & 24 are amended to recite the subject matter of originally filed dependent claims 2, 3, 10, 14, 15, 22, 25 & 26, and thus, these dependent claims are canceled herein without prejudice. No new matter is added to the application by any amendment presented.

Based on the amendments to independent claims 1, 13 & 24, withdrawal of the double patenting rejection is respectfully requested. As noted, each independent claim recites the subject matter of original claims 3, 10, 15, 22 & 26, which were not provisionally rejected on the ground of non-statutory obviousness-type double patenting. With respect to claim 26, it is noted that the Office Action references claim 26 at page 3, but no substantive rejection of claim 26 follows. Still further, with respect to independent claim 24, the amended claim presented herewith recites the subject matter of dependent claims 10 & 21, neither of which received the double patenting rejection. Thus, the double patenting rejection is believed moot in view of the amendments presented herewith.

Substantively, claims 1-2, 5, 7-8, 13-14, 18-19, 24-25 & 28-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi et al. (U.S. Patent No. 6,182,742; hereinafter Takahashi) at page 5, paragraph 3 of the Office Action. However, in subsequent pages, claims 3, 4, 6, 9, 10, 15-17, 20, 26 & 27 are also rejected. Therefore, Applicants interpret the initial rejection as comprising a rejection of claims 1-10, 13-21 & 24-29 as itemized on the Office Action Summary page. This rejection, to the extent relevant to the claims presented herewith, is respectfully but most strenuously, traversed and reconsideration thereof is requested.

Applicants request reconsideration and withdrawal of the obviousness rejection on the following grounds: (1) Takahashi fails to disclose Applicants' now claimed invention; (2) the Takahashi patent lacks any teaching, suggestion or incentive for its further modification as necessary to achieve Applicants' recited invention; and (3) the needed modifications, to the extent characterized in the Office Action, are a hindsight reconstruction of the claimed invention using Applicants' own disclosed subject matter.

As recited in claim 1, for example, Applicants' invention is directed to a cooling system which includes:

- at least two *modular* cooling units (MCUs), each MCU being capable of providing system coolant to multiple electronics subsystems to be cooled;
- each MCU of the at least two MCUs includes a heat exchanger, a first cooling loop with at least one control valve, and a second cooling loop, wherein when an MCU of the at least two MCUs is operational, the first cooling loop receives chilled facility coolant from a source and passes at least a portion thereof through the heat exchanger, the portion being controlled by the at least one control valve, and the second cooling loop provides cooled system coolant to the multiple electronics subsystems, and expels heat in the heat exchanger from the multiple electronic subsystems to the chilled facility coolant in the first cooling loop, wherein the at least one control valve allows regulation of facility coolant flow through the heat exchanger, thereby allowing control of a desired temperature of the system coolant in the second cooling loop for cooling the multiple electronic subsystems;
- wherein when the cooling system is operational, only one MCU of the at least two MCUs is operating to provide system coolant to the multiple electronic subsystems, with at least one other MCU of the at least two MCUs being in standby mode;
- wherein the cooling system further includes *couplings associated with the at least two MCUs which allow each MCU to be removed while another MCU of the at least two MCUs is operation and providing system coolant to the multiple electronic subsystems*;
- *each MCU further including a system coolant expansion tank in communication with a second cooling loop, wherein the system coolant expansion tanks of the at least two MCUs are connected in fluid communication to ensure that sufficient system coolant remains in the system coolant expansion tank of an operating MCU.*

Initially, Applicants respectfully submit that Takahashi fails to disclose various aspects of their recited invention, some of which are acknowledged in the Office Action. For example, at page 6, the Office Action acknowledges that Takahashi is silent as to whether or not the cooling units are *modular*. A careful reading of Takahashi fails to uncover any teaching or suggestion of modularity of cooling units. In contrast, Applicants respectfully submit that Takahashi teaches away from modularity by providing an integrated electronic system cooling apparatus 1000 which employs a single tank 1400 for temporarily storing the warmed cooling liquid returned from the plurality of electronic systems 100. Notwithstanding this, the Office Action alleges that:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide means to for the units to be modular in order to quick interchangeability of components.

Applicants respectfully submit that such an assertion is not based on any teaching or suggestion of Takahashi, or the other art of record, and as such is insufficient to establish obviousness. Thus, Applicants submit that the Office Action fails to state a *prima facie* case of obviousness against the independent claims presented. The Office Action clearly acknowledges that Takahashi does not teach that the cooling units are modular.

Further, each of the independent claims recites the subject matter of original claims 3, 15 & 26, respectively. Specifically, the independent claims recite that the cooling system further includes coupling associated with the at least two MCUs which allow each MCU *to be removed* while another MCU of the at least two MCUs is operational and provides system coolant to the multiple electronic subsystems. At page 6, the Office Action acknowledges that Takahashi fails to disclose couplings to allow removing MCUs, but then asserts:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a means through coupler or any other means to allow servicing (including the removal or replacement) of the cooling units while a redundant cooling unit is operating.

The couplers recited in the independent claims of Applicants' invention relate to the modularity of Applicants' cooling units. Since there is no modularity in Takahashi, there would be no need for couplers as recited in the independent claims presented herewith.

It is respectfully submitted that an “obviousness” determination requires an evaluation of whether the prior art taken as a whole would suggest the claimed invention taken as a whole to one of ordinary skill in the art. In evaluating claimed subject matter as a whole, the Federal Circuit has expressly mandated that functional claim language be considered in evaluating a claim relative to the prior art. Applicants respectfully submit that the application of these standards to the independent claims presented herewith leads to the conclusion that the recited subject matter would not have been obvious to one of ordinary skill in the art based on the applied patent.

Still further, each of the independent claims at issue recites that *each MCU further includes a system coolant expansion tank in communication with the second cooling loop*. In addition, the system cooling expansion tanks of the at least two MCUs are connected in fluid communication to ensure that sufficient fluid coolant remains in the system coolant expansion tank of an operating MCU. With respect to the subject matter, the Office Action alleges that:

While Takahashi fails to teach a separate system coolant tank for each MCU, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to duplicate the system coolant expansion tank to ensure redundancy in case of a failure of one of the expansion tanks.

Even accepting the Examiner’s rationale that it would have been obvious to duplicate the expansion tank of Takahashi, one skilled in the art would not arrive a cooling system such as recited by Applicants in the claims presented. In Takahashi, the cooling tank 1400 is clearly external to the two cooling control units 1100A and 1100B. Thus, simple duplication of the expansion tank 1400 in Takahashi would not result in the cooling system recited by Applicants. In Applicants’ approach, each *modular* cooling unit includes a system coolant expansion tank in communication with a second cooling loop. Based upon this, reconsideration and withdrawal of the obviousness rejection to the claims presented is requested.

Further, Applicants’ independent claims recite that the system coolant expansion tanks of the at least two MCUs *are connected in fluid communication to ensure that sufficient system coolant remains in the system coolant expansion tank of an operating MCU*. This aspect of Applicants’ system is not addressed by the Office Action, and as such, Applicants respectfully submit that a *prima facie* case of obviousness against the subject matter presented herewith has

not been stated. A careful reading of Takahashi fails to uncover any teaching or suggestion of *modular* cooling units which include: (1) a system coolant expansion tank in communication with a second cooling loop; and (2) coupling of the system cooling expansion tanks of the MCUs in fluid communication to ensure that sufficient system coolant remains in the system coolant expansion tank of an operating MCU. For at least this additional reason, reconsideration and withdrawal of the obviousness rejection is respectfully requested.

Still further, upon a review of Takahashi, there is no teaching, suggestion or incentive for its further modification as proposed in the Office Action. The above-noted modifications to the teachings of Takahashi stated in the Office Action provide no technical basis outside that contained in Applicants' own specification. Thus, the rejection is believed to violate the well-known principle that Applicants' own disclosure cannot be used as a reference against them.

The consistent criterion for the determination of obviousness is whether the art would have suggested to one of ordinary skill in the art that the claimed invention should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. The suggestion and the expectation of success must be found in the prior art, not in the Applicants' disclosure. In re Dow Chemical Company, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir, 1998) (multiple citations omitted).

The alleged modifications at issue are simply characterized in the language of Applicants' own disclosure, rather than an identified basis in the prior art for achieving the modifications necessary to arrive at Applicants' claimed invention, in violation of this well-known principle. This is yet another, independent reason why the current invention is not obvious over the applied art.

For at least the above reasons, Applicants respectfully submit that independent claims 1, 13 & 24 patentably distinguish over the teachings of Takahashi. Reconsideration and withdrawal of the obviousness rejection based thereon is therefore requested. The dependent claims are believed allowable for the same reasons as their respective independent claims, as well as for their own additional characterizations.

All claims are believed to be in condition for allowance and such action is respectfully requested.

If a telephone conference would be of assistance in advancing prosecution of the subject application, Applicants' undersigned attorney invites the Examiner to telephone him at the number provided.

Respectfully submitted,

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